DICOM Conformance Statement

# *syngo* Dynamics Server (Standalone)

VA41

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# 1. Introduction

## 1.1 Purpose of this document

This conformance statement describes the DICOM Interface of the *syngo*® Dynamics implementation of a Medical Imaging Storage and Archive System (*syngo* Dynamics DICOM Server) running Software Version VA41. From this point forward, *syngo* Dynamics DICOM Server will be referred to as *syngo* Dynamics Server.

The *syngo* Dynamics Server DICOM Interface acts as a service class provider (SCP) for Storage, Storage Commitment, MPPS, Verification and Query/Retrieve Service Classes.

The *syngo* Dynamics Server DICOM Interface acts as a service class user (SCU) for Storage, Storage Commitment, Verification, Query/Retrieve, MPPS, Patient Management, Study Management, Results Management and Basic Worklist Management Service Classes.

This DICOM Conformance Statement is written according to Part PS3.2 2016a of the DICOM 3.0 standard.

## 1.2 Sources for this document

ACR-NEMA Digital Imaging and Communications in Medicine (DICOM) Version 3, Parts 1–20 [1].

## 1.3 Acronyms and abbreviations

The following acronyms and abbreviations are used in this document.

| | |
|---|---|
| ACR | American College of Radiology |
| AE | Application Entity |
| DICOM | Digital Imaging and Communications in Medicine |
| FSC | File-set Creator |
| FSR | File-set Reader |
| FSU | File-set Updater |
| NEMA | National Electrical Manufacturers Association |
| PDU | Protocol Data Unit |
| SCP | Service Class Provider |
| SCU | Service Class User |
| SOP | Service Object Pair |
| SR | Structured Report |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| UID | Unique Identifier |
| MPPS | Modality Performed Procedure Step |
| PACS | Picture Archiving and Communication System |

## 1.4 References

**[1]** Digital Imaging and Communications in Medicine (DICOM PS3.1-3.20 2016a), National Electrical Manufacturers Association (NEMA), **medical.nema.org**

## 1.5 Connectivity and interoperability

The implementation of the *syngo* Dynamics Server DICOM interface has been tested to assure correspondence with this Conformance Statement. But the Conformance Statement and the DICOM standard does not guarantee interoperability.

The user must compare the relevant Conformance Statements and if a successful interconnection should be possible, the user is responsible to specify an appropriate test suite and to validate the interoperability, which is required.

A network environment may need additional functions out of the scope of DICOM.

# 2. Implementation model

*syngo* Dynamics Server is an image database and storage facility. *syngo* Dynamics Server is a single application entity that stores images sent to it by service class users, takes responsibility for storage of the objects, allows queries based on several standard query models, and retrieves requested images. The *syngo* Dynamics Server is able to reconcile object header information before the images are stored internally by querying a modality worklist service class provider for demographic information. Studies found to be registered with the HIS/RIS are stored, while studies not found to be registered are automatically corrected, where possible, or set aside for a technician to correct. Study status messages can be sent to service class providers and received from service class users to reflect changes in the state of the study.

## 2.1 Application data flow diagram

Figure 2.1-1 depicts the DICOM data flow to and from *syngo* Dynamics Server. This section discusses the application's data flow represented in this diagram.

In the remote real-world activity labeled "Verify Communication", a remote application entity (AE) initiates an association and requests verification from *syngo* Dynamics Server. Assuming *syngo* Dynamics Server receives the request, it responds to the remote AE and communication between the two AE's has been verified. *syngo* Dynamics Server can also initiate an association and request verification to a remote AE.

In the remote real-world activity "Store Objects", a remote AE initiates an association with *syngo* Dynamics Server and sends one or more objects to *syngo* Dynamics Server. When *syngo* Dynamics Server receives an object, it stores that object in Part 10 format on some media and registers that object in the database. *syngo* Dynamics Server can also initiate an association and send one or more objects to a remote AE.

In the remote real-world activity "Request Storage Commitment", a remote AE initiates an association with *syngo* Dynamics Server and requests commitment for the safekeeping of one or more composite SOP instances on *syngo* Dynamics Server. *syngo* Dynamics Server will open a new association with the remote AE to indicate success or failure. *syngo* Dynamics Server can also initiate an association and request commitment for the safekeeping of one or more composite SOP instances to a remote AE.

In the remote real-world activity "Find Objects", a remote AE initiates an association with *syngo* Dynamics Server and sends a query. *syngo* Dynamics Server will search the database for possible matches with composite SOP instances. The results of the query are returned to the remote AE using the same association. *syngo* Dynamics Server can also initiate an association and send a query to a remote AE.

In the remote real-world activity "Move Objects", a remote AE initiates an association with *syngo* Dynamics Server and requests some composite SOP instances be retrieved. *syngo* Dynamics Server will search the database for possible matches with composite SOP instances. The resulting composite SOP instances are transferred to either the same AE that requested the retrieval or to another AE over a new association. *syngo* Dynamics Server can also initiate an association and request some composite SOP instances be retrieved from a remote AE.

In the remote real-world activity "Get Worklist", *syngo* Dynamics Server initiates an association with a remote AE and sends a query for information about a patient or study. *syngo* Dynamics Server will update Composite SOP instances with information obtained from the query.

In the remote real-world activity "Unsolicited Notifications", a remote AE initiates an association with *syngo* Dynamics Server and sends an unsolicited notification event containing changes in the state of a patient, study, visit, or interpretation. If the particular notification event is recognized, then *syngo* Dynamics Server updates its database or performs events based on configuration settings.

In the remote real-world activity "Study Update", a remote AE initiates an association with *syngo* Dynamics Server and sends an MPPS message indicating the status of a study being performed. *syngo* Dynamics Server will reflect the status changes accordingly. *syngo* Dynamics Server can also initiate an association with a remote AE and provide status information.

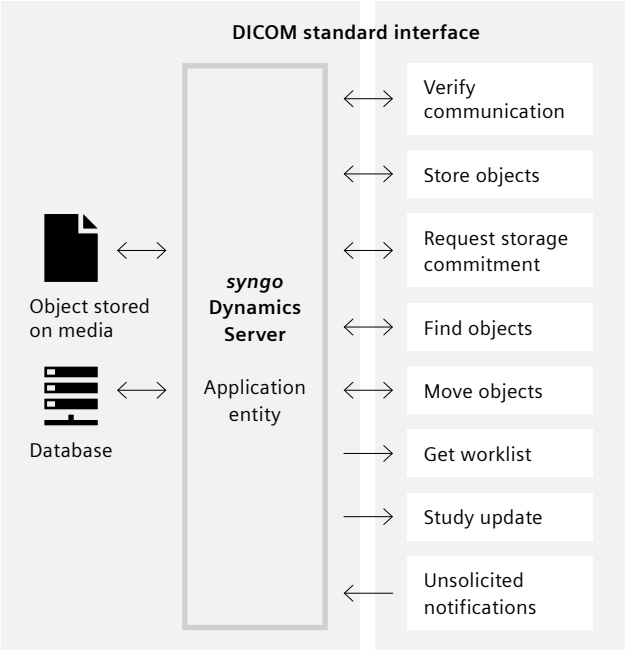


**Figure 2.1-1:** *syngo* Dynamics Server implementation model

## 2.2 Functional definition of application entities

*syngo* Dynamics Server operates as a single AE whose title is configurable. Its functions are described in section 2.1.

## 2.3 Sequencing of real-world activities

- *syngo* Dynamics Server must store objects to a remote AE before a storage commitment request for those objects is sent.
- *syngo* Dynamics Server must receive objects from a remote AE before a study update is sent outbound.
- If configured to archive objects to PACS, *syngo* Dynamics Server may request objects be moved from a remote AE to local media to service an object move request from another remote AE.

# 3. Application entity specifications

*syngo* Dynamics Server operates as a single application entity.

## 3.1 *syngo* Dynamics Server specifications

The *syngo* Dynamics Server Application Entity provides Standard Conformance to the DICOM V3.0 SOP Classes listed in Table 3.1-1 as an SCU and/or SCP:

**Table 3.1-1:** *syngo* Dynamics DICOM Server Supported SOP Classes

| SOP Classes | SOP Class UID | SCU/SCP |
|---|---|---|
| Verification | 1.2.840.10008.1.1 | Y/Y |
| Basic Study Content Notification | 1.2.840.10008.1.9 | Y/N |
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 | Y/Y |
| Detached Patient Management | 1.2.840.10008.3.1.2.1.1 | Y/N |
| Detached Visit Management | 1.2.840.10008.3.1.2.2.1 | Y/N |
| Detached Study Management | 1.2.840.10008.3.1.2.3.1 | Y/N |
| Study Component Management | 1.2.840.10008.3.1.2.3.2 | Y/N |
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | Y/Y |
| Detached Interpretation Management | 1.2.840.10008.3.1.2.6.1 | Y/N |
| Computed Radiography Image Storage | 1.2.840.10008.5.1.4.1.1.1 | Y/Y |
| Digital X-Ray Image Storage – For Presentation | 1.2.840.10008.5.1.4.1.1.1.1 | Y/Y |
| Digital X-Ray Image Storage – For Processing | 1.2.840.10008.5.1.4.1.1.1.1.1 | Y/Y |
| CT Image Storage | 1.2.840.10008.5.1.4.1.1.2 | Y/Y |
| Enhanced CT Image Storage | 1.2.840.10008.5.1.4.1.1.2.1 | Y/Y |
| Ultrasound Multi-frame Image Storage (Retired) | 1.2.840.10008.5.1.4.1.1.3 | Y/Y |
| Ultrasound Multi-frame Image Storage | 1.2.840.10008.5.1.4.1.1.3.1 | Y/Y |
| MR Image Storage | 1.2.840.10008.5.1.4.1.1.4 | Y/Y |
| Enhanced MR Image Storage | 1.2.840.10008.5.1.4.1.1.4.1 | Y/Y |
| Ultrasound Image Storage (Retired) | 1.2.840.10008.5.1.4.1.1.6 | Y/Y |
| Ultrasound Image Storage | 1.2.840.10008.5.1.4.1.1.6.1 | Y/Y |
| Enhanced US Volume Storage | 1.2.840.10008.5.1.4.1.1.6.2 | Y/Y |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | Y/Y |
| Multi-frame Single Bit Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.1 | Y/Y |
| Multi-frame Grayscale Byte Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.2 | Y/Y |

| SOP Classes | SOP Class UID | SCU/SCP |
|---|---|---|
| Multi-frame Grayscale Word Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.3 | Y/Y |
| Multi-frame True Color Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.4 | Y/Y |
| 12-lead ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.1 | Y/Y |
| General ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.2 | Y/Y |
| Ambulatory ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.3 | Y/Y |
| Hemodynamic Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.2.1 | Y/Y |
| Cardiac Electrophysiology Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.3.1 | Y/Y |
| Basic Voice Audio Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.4.1 | Y/Y |
| General Audio Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.4.2 | Y/Y |
| Arterial Pulse Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.5.1 | Y/Y |
| Respiratory Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.6.1 | Y/Y |
| Grayscale Softcopy Presentation State Storage SOP Class | 1.2.840.10008.5.1.4.1.1.11.1 | Y/Y |
| X-ray Angiographic Image Storage | 1.2.840.10008.5.1.4.1.1.12.1 | Y/Y |
| X-Ray Radiofluoroscopic Image | 1.2.840.10008.5.1.4.1.1.12.2 | Y/Y |
| Nuclear Medicine Image Storage | 1.2.840.10008.5.1.4.1.1.20 | Y/Y |
| Raw Data Storage | 1.2.840.10008.5.1.4.1.1.66 | Y/Y |
| Segmentation Storage | 1.2.840.10008.5.1.4.1.1.66.4 | Y/Y |
| Basic Text SR | 1.2.840.10008.5.1.4.1.1.88.11 | Y/Y |
| Enhanced SR | 1.2.840.10008.5.1.4.1.1.88.22 | Y/Y |
| Comprehensive SR | 1.2.840.10008.5.1.4.1.1.88.33 | Y/Y |
| X-Ray Radiation Dose SR | 1.2.840.10008.5.1.4.1.1.88.67 | Y/Y |
| Positron Emission Tomography Image Storage | 1.2.840.10008.5.1.4.1.1.128 | Y/Y |
| Surface Segmentation Objects (SSO) | 1.2.840.10008.5.1.4.1.1.66.5 | Y/Y |
| Registration objects (REG) | 1.2.840.10008.5.1.4.1.1.66.1 | Y/Y |
| Encapsulated PDF Storage | 1.2.840.10008.5.1.4.1.1.104.1 | Y/Y |
| Patient Root Query/Retrieve IM Find | 1.2.840.10008.5.1.4.1.2.1.1 | Y/Y |
| Patient Root Query/Retrieve IM Move | 1.2.840.10008.5.1.4.1.2.1.2 | Y/Y |
| Study Root Query/Retrieve IM Find | 1.2.840.10008.5.1.4.1.2.2.1 | Y/Y |
| Study Root Query/Retrieve IM Move | 1.2.840.10008.5.1.4.1.2.2.2 | Y/Y |
| Patient/Study Root Query/Retrieve IM Find | 1.2.840.10008.5.1.4.1.2.3.1 | Y/Y |
| Patient/Study Root Query/Retrieve IM Move | 1.2.840.10008.5.1.4.1.2.3.2 | Y/Y |

| SOP Classes | SOP Class UID | SCU/SCP |
|---|---|---|
| Modality Worklist Information Model C-Find | 1.2.840.10008.5.1.4.31 | Y/N |
| Standalone Modality LUT | 1.2.840.10008.5.1.4.1.1.10 | Y/Y |
| Encapsulated PDF | 1.2.840.10008.5.1.4.1.1.104.1 | Y/Y |
| XA Biplane | 1.2.840.10008.5.1.4.1.1.12.3 | Y/Y |

**Note:** The *syngo* Dynamics Server Application Entity provides Conformance to additional private SOP Classes listed in Table 5.1-1 as an SCU and/or SCP. The administrator can add or remove SOP classes site specific by configuration.

## 3.1.1 Association establishment policies

**General**
The following Application Context Name will be proposed and recognized by *syngo* Dynamics Server:

- DICOM 3.0 Application Context 1.2.840.10008.3.1.1.1

*syngo* Dynamics Server defaults to a PDU Size of 100000 as an SCU and SCP. It will send the value of 100000 in DICOM Association Negotiations. The maximum PDU size is configurable.

**Number of associations**
The maximum number of simultaneous associations accepted by *syngo* Dynamics Server is configurable at run time based on system resources available. By default, the maximum number of associations is set at 64. There is no inherent limit to the number of associations other than limits imposed by the computer operating system.

**Asynchronous nature**
*syngo* Dynamics Server allows a single outstanding operation on any association. Therefore, *syngo* Dynamics Server does not support asynchronous operations window negotiation other than the default as specified by the DICOM specification.

**Implementation identifying information**
*syngo* Dynamics Server uses the following implementation identifying parameters:

- Implementation Class UID: 1.2.124.113532.3510.82858
- Implementation Version Name: AGFAOCT2007

## 3.1.2 Association initiation by real-world activity

*syngo* Dynamics Server only initiates associations for the following real-world activities:

- Verify Communication
- Store Objects
- Request Storage Commitment
- Find Object
- Move Object
- Get Patient/Study Information
- Notification of Study Status Change

#### 3.1.2.1 Real-World Activity – Verify Communication

**Associated Real-World Activity – Verify Communication**
*syngo* Dynamics Server will verify DICOM connections. An association is established when the user initiates a station test operation from the graphical user interface.

**Proposed Presentation Contexts – Verify Communication**
*syngo* Dynamics Server will propose the Presentation Contexts shown in Table 3.1-2.

**SOP Specific Conformance – Verify Communication**
*syngo* Dynamics Server provides standard conformance to the DICOM Verification Service Class as an SCU.

#### 3.1.2.2 Real-World Activity – Store Objects

**Associated Real World-Activity – Store Objects**
*syngo* Dynamics Server will send objects that have been sent to it previously to a remote AE for storage. An association is established when the user initiates a transmit request. *syngo* Dynamics Server will establish an association automatically in response to a C-MOVE request, archive to PACS autopilot notification or configured study routing rules.

**Proposed Presentation Contexts – Store Objects**
*syngo* Dynamics Server may propose any of the Presentation Contexts shown in Table 3.1-3. *syngo* Dynamics Server will propose the transfer syntax used when the object was initially accepted by the server and Implicit VR Little Endian.

**Table 3.1-2:** Proposed Presentation Contexts – Verify communication

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | | |
|---|---|---|---|---|---|
| **Name** | **UID** | **Name** | **UID** | **Role** | **Extended Negotiation** |
| Verification | 1.2.840.10008.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |

**Table 3.1-3:** Proposed presentation contexts – Store Objects

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended Negotiation |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | |
| Computed Radiography Image Storage | 1.2.840.10008.5.1.4.1.1.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Digital X-Ray Image Storage – For Presentation | 1.2.840.10008.5.1.4.1.1.1.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Digital X-Ray Image Storage – For Processing | 1.2.840.10008.5.1.4.1.1.1.1.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| CT Image Storage | 1.2.840.10008.5.1.4.1.1.2 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Enhanced CT Image Storage | 1.2.840.10008.5.1.4.1.1.2.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1 | SCU | None |
| Ultrasound Multi-frame Image Storage (Retired) | 1.2.840.10008.5.1.4.1.1.3 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Ultrasound Multi-frame Image Storage | 1.2.840.10008.5.1.4.1.1.3.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>RLE Lossless 1.2.840.10008.1.2.5<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| MR Image Storage | 1.2.840.10008.5.1.4.1.1.4 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Ultrasound Image Storage (Retired) | 1.2.840.10008.5.1.4.1.1.6 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Ultrasound Image Storage | 1.2.840.10008.5.1.4.1.1.6.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>RLE Lossless 1.2.840.10008.1.2.5<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Enhanced US Volume Storage | 1.2.840.10008.5.1.4.1.1.6.2 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Multi-frame Single Bit Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Multi-frame Grayscale Byte Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.2 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Multi-frame Grayscale Word Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.3 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Multi-frame True Color Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.4 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| 12-lead ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| General ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.2 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Ambulatory ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.3 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Hemodynamic Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.2.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Cardiac Electrophysiology Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.3.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Basic Voice Audio Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.4.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| General Audio Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.4.2 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Arterial Pulse Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.5.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Respiratory Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.6.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Grayscale Softcopy Presentation State Storage | 1.2.840.10008.5.1.4.1.1.11.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| X-Ray Angiographic Image Storage | 1.2.840.10008.5.1.4.1.1.12.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless Baseline (Process 1) 1.2.840.10008.1.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| X-Ray Radiofluoroscopic Image | 1.2.840.10008.5.1.4.1.1.12.2 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Nuclear Medicine Image Storage | 1.2.840.10008.5.1.4.1.1.20 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Raw Data Storage | 1.2.840.10008.5.1.4.1.1.66 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>RLE Lossless 1.2.840.10008.1.2.5<br>JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70 | SCU | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | Role | Extended Negotiation |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | | |
| Basic Text SR | 1.2.840.10008.5.1.4.1.1.88.11 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Enhanced SR | 1.2.840.10008.5.1.4.1.1.88.22 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Comprehensive SR | 1.2.840.10008.5.1.4.1.1.88.33 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| X-Ray Radiation Dose SR | 1.2.840.10008.5.1.4.1.1.88.67 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |
| Encapsulated PDF Storage | 1.2.840.10008.5.1.4.1.1.104.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Positron Emission Tomography Image Storage | 1.2.840.10008.5.1.4.1.1.128 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless, Non-Hierarchical (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70 | SCU | None |
| Surface Segmentation Objects | 1.2.840.10008.5.1.4.1.1.66.5 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70 | SCU | None |
| Registration objects | 1.2.840.10008.5.1.4.1.1.66.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70 | SCU | None |
| Standalone Modality LUT | 1.2.840.10008.5.1.4.1.1.10 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70 | SCU | None |
| XA Biplane | 1.2.840.10008.5.1.4.1.1.12.3 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCU | None |

**SOP Specific Conformance – Store Objects**
*syngo* Dynamics Server provides Standard conformance to the DICOM Storage Service Class as an SCU.

Depending on the *syngo* Dynamics Server Storage Commitment configuration, a successful C-Store response status may generate a corresponding Storage Commitment request per object stored or not generate any actions until all objects of the study have been stored.

An unsuccessful C-Store response will generate a warning dialog and the operation will remain in the Job Queue. The number of automated retry attempts and the time interval between each is configurable for each remote AE. The user is notified of storage failures. Studies are not removed from the system until successfully archived.

The private Cerner status code 0x0111 (image already exists) is interpreted as a success if the receiving node is configured as a CERNER node.

A warning status received in response to a C-Store operation will be treated in the same manner as an unsuccessful C-Store response.

### 3.1.2.3 Real-World Activity – Request Storage Commitment

**Associated Real-World Activity – Request Storage Commitment**
*syngo* Dynamics Server can send images to another SCP for permanent storage and request safe keeping of a set of SOP instances. *syngo* Dynamics Server expects a notification response from the SCP.

**Proposed Presentation Contexts – Request Storage Commitment**
*syngo* Dynamics Server will propose the Presentation Contexts shown in Table 3.1-4.

**Table 3.1-4:** Proposed presentation contexts – Request storage commitment

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended Negotiation |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | |
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCU | None |

**SOP Specific Conformance – Request Storage Commitment**

*syngo* Dynamics Server provides partial conformance to the DICOM Storage Commitment Service Class as an SCU. The Action Type and Action Information specified in Table 3.1-5 are supported.

**Table 3.1-5:** Storage Commitment Request – Action Information

| Action type name | Action type ID | Attribute name | Tag |
|---|---|---|---|
| Request Storage Commitment | 1 | Transaction UID | (0008,1195) |
| | | Referenced SOP Sequence | (0008,1199) |
| | | >Referenced SOP Class UID | (0008,1150) |
| | | >Referenced SOP Instance UID | (0008,1155) |
| | | Referenced Study Component Sequence | (0008,1111) |
| | | >Referenced SOP Class UID | (0008,1150) |
| | | >Referenced SOP Instance UID | (0008,1155) |

**Operations**

*syngo* Dynamics Server will generate an N-ACTION primitive if the local configuration setting for the remote AE is enabled for storage commitment. *syngo* Dynamics Server only supports the Storage AE as the destination for the storage commitment N-Action.

- *syngo* Dynamics Server supports storage commitment for all the SOP Class UIDs listed in Table 3.1-3.
- *syngo* Dynamics Server supports the Referenced Study Component Sequence Attribute.
- *syngo* Dynamics Server will keep the Transaction ID applicable indefinitely.
- *syngo* Dynamics Server does not support the optional Storage Media File-Set ID and UID Attributes in the N-Action
- *syngo* Dynamics Server can send a Storage Commitment request on a per object or per study basis.

**Notifications**

- *syngo* Dynamics Server does not perform any notification-based actions when a success status is received.
- *syngo* Dynamics Server will generate a warning dialog and the operation will remain in the Job Queue when a failure status is received. The number of automated retry attempts and the time interval between each is configurable for each remote AE. Please note that depending on the performance of the storage commitment SCP these settings might need to be adapted.

**Implementation Specific Details**

- If Storage Commitment is enabled for the Archive Storage AE:
  - *syngo* Dynamics Server will consider locally cached study data as available for deletion to free space if a successful Storage Commitment response was returned from that Storage AE for the objects in the commitment request and other deletion criteria are met. Only objects successfully committed are available for local deletion if space is needed.
- If Storage Commitment is not enabled for the Archive Storage AE:
  - *syngo* Dynamics Server does not perform any actions when a success status is received.
- *syngo* Dynamics Server can be configured to send a Storage Commitment request on a per object or per study basis.

### 3.1.2.4 Real-World Activity – Find Object

**Associated Real-World Activity – Find Object**

*syngo* Dynamics Server can query a remote AE for composite objects to the Series Level. An association is established when the user initiates a query from the graphical user interface. *syngo* Dynamics Server will establish an association automatically to query a remote AE to obtain a list of relevant objects based on pre-fetch configuration rules.

**Proposed Presentation Contexts – Find Object**

*syngo* Dynamics Server will propose the Presentation Contexts shown in Table 3.1-6.

**Table 3.1-6:** Proposed Presentation Contexts – Find Object

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Patient Root Query/Retrieve IM Find | 1.2.840.10008.5.1.4.1.2.1.1 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCU | Yes |
| Study Root Query/Retrieve IM Find | 1.2.840.10008.5.1.4.1.2.2.1 | | | |
| Patient/Study Only Query/Retrieve IM Find | 1.2.840.10008.5.1.4.1.2.3.1 | | | |

**SOP Specific Conformance – Find Object**
*syngo* Dynamics Server provides standard conformance to the DICOM Query/Retrieve Service Class as an SCU. The Query/Retrieve Information Model used depends on the attributes used to constrain the query. *syngo* Dynamics Server supports the Relational queries extended SCU behavior. The Attributes used in the Patient Root Query are listed in Table 3.1-7. The Patient and Study Level Attributes in Table 3.1-7 are also supported for the Patient/Study Only Query/Retrieve.

**Table 3.1-7:** Patient Root Query Attributes

| Level | Description | Tag | Type |
|---|---|---|---|
| Patient | Patient's Name | (0010,0010) | R |
| Patient | Patient ID | (0010,0020) | U |
| Patient | Patient's Birth Date | (0010,0030) | O |
| Patient | Patient's Sex | (0010,0040) | O |
| Patient | Current Patient Location | (0038,0300) | O |
| Study | Study Date | (0008,0020) | R |
| Study | Study Time | (0008,0030) | R |
| Study | Accession Number | (0008,0050) | R |
| Study | Study ID | (0020,0010) | R |
| Study | Study Instance UID | (0020,000D) | U |
| Study | Modalities in Study | (0008,0061) | O |
| Study | Referring Physician's Name | (0008,0090) | O |
| Study | Study Description | (0008,1030) | O |
| Study | Name of Physician(s) Reading Study | (0008,1060) | O |
| Study | Admitting Diagnoses Description | (0008,1080) | O |
| Study | Patient's Age | (0010,1010) | O |
| Study | Number of Study Related Instances | (0020,1208) | O |
| Study | Station Name | (0008,1010) | O |
| Study | Performing Physician's Name | (0008,1050) | O |
| Study | Study Status ID | (0032,000A) | O |
| Study | Requesting Physician | (0032,1032) | O |
| Series | Modality | (0008,0060) | R |
| Series | Series Number | (0020,0011) | R |
| Series | Series Instance UID | (0020,000E) | U |
| Series | Series Description | (0008,103E) | O |
| Series | Operator's Name | (0008,1070) | O |

**Note 1:** *syngo* Dynamics Server includes the Patient ID Attribute in all levels of the query and Study Instance UID Attribute in the Series level query.

**Note 2:** *syngo* Dynamics Server is capable of both upper and lower case letters in the Query/Retrieve User Interface fields.

**Note 3:** *syngo* Dynamics Server will use the wildcard "*" instead of the ^ in the name field as a separator, example: lastname*firstname for queries.

*syngo* Dynamics Server supports the Relational-queries extended SCU behavior. The Attributes used in the Study Root Query are listed in Table 3.1-8.

**Table 3.1-8:** Patient Root Query Attributes

| Level | Description | Tag | Type |
|---|---|---|---|
| Level | Description | Tag | Type |
| Study | Study Date | (0008,0020) | R |
| Study | Study Time | (0008,0030) | R |
| Study | Accession Number | (0008,0050) | R |
| Study | Patient's Name | (0010,0010) | R |
| Study | Patient ID | (0010,0020) | R |
| Study | Study ID | (0020,0010) | R |
| Study | Study Instance UID | (0020,000D) | U |
| Study | Modalities in Study | (0008,0061) | O |
| Study | Referring Physician's Name | (0008,0090) | O |
| Study | Study Description | (0008,1030) | O |
| Study | Name of Physician(s) Reading Study | (0008,1060) | O |
| Study | Admitting Diagnoses Description | (0008,1080) | O |
| Study | Patient's Birth Date | (0010,0030) | O |
| Study | Patient's Sex | (0010,1040) | O |
| Study | Patient's Age | (0010,1010) | O |
| Study | Number of Study Related Instances | (0020,1208) | O |
| Study | Station Name | (0008,1010) | O |
| Study | Performing Physician's Name | (0008,1050) | O |
| Study | Study Status ID | (0032,000A) | O |
| Study | Requesting Physician | (0032,1032) | O |
| Study | Current Patient Location | (0038,0300) | O |

| Level | Description | Tag | Type |
|---|---|---|---|
| Series | Modality | (0008,0060) | R |
| Series | Series Number | (0020,0011) | R |
| Series | Series Instance UID | (0020,000E) | U |
| Series | Series Description | (0008,103E) | O |
| Series | Operator's Name | ((0008,1070) | O |

**Note 1:** *syngo* Dynamics Server includes the Study Instance UID Attribute in the Series level query

**Note 2:** *syngo* Dynamics Server is capable of both upper and lower case letters in the Query/Retrieve User Interface fields.

**Note 3:** *syngo* Dynamics Server will use the wildcard "*" instead of the ^ in the name field as a separator, example: lastname*firstname for queries.

**3.1.2.5 Real-World Activity – Move Object**

**Associated Real-World Activity – Move Object**
*syngo* Dynamics Server can retrieve composite objects from a remote AE. An association is established when the user initiates a query from the graphical user interface. *syngo* Dynamics Server will establish an association automatically to retrieve objects that were archived to the remote AE or to pre-fetch relevant objects from the remote AE based on pre-fetch configuration rules.

**Proposed Presentation Contexts – Move Object**
*syngo* Dynamics Server will propose the Presentation Contexts shown in Table 3.1-9.

**Table 3.1-9:** Proposed Presentation Contexts – Find Object

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Patient Root Query/ Retrieve IM Move | 1.2.840.10008.5.1.4.1.2.1.2 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCU | Yes |
| Study Root Query/ Retrieve IM Move | 1.2.840.10008.5.1.4.1.2.2.2 | | | |
| Patient/Study Only Query/Retrieve IM Move | 1.2.840.10008.5.1.4.1.2.3.2 | | | |

**SOP Specific Conformance – Move Object**
*syngo* Dynamics Server provides standard conformance to the DICOM Query/Retrieve Service Class as an SCU.

- *syngo* Dynamics Server supports the Relational-retrieve extended SCU behavior.

#### 3.1.2.6 Real-World Activity – Get Worklist

**Associated Real-World Activity – Get Worklist**
*syngo* Dynamics Server can query a remote AE for patient and study information that matches certain query constraints. *syngo* Dynamics Server will establish an association with a remote AE when the user initiates a query from the graphical user interface. *syngo* Dynamics Server will establish an association automatically to verify an incoming study or if an unsolicited notification is received from a remote AE depending on HIS verification configuration rules.

**Proposed Presentation Contexts – Get Worklist**
*syngo* Dynamics Server will propose the Presentation Contexts shown in Table 3.1-10.

**Table 3.1-10:** Proposed Presentation Contexts – Get Worklist

| Presentation Context Table | | | | |
|---|---|---|---|---|
| **Abstract Syntax** | | **Transfer Syntax** | | |
| **Name** | **UID** | **Name UID** | **Role** | **Extended Negotiation** |
| Modality Worklist Information Model – FIND | 1.2.840.10008.5.1.4.31 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCU | None |

**SOP Specific Conformance – Get Worklist**
*syngo* Dynamics Server provides Standard conformance to the DICOM Basic Worklist Management Service Class as an SCU.

*syngo* Dynamics Server may request matching on the following Optional Matching Key Attributes:

- Accession Number (0008,0050)
- Referring Physician's Name (0008,0090)
- Study Instance UID (0020,000D)
- Study Status ID (0032,000A)
- Scheduled Station Name (0040, 0400)

The Study Classification and Study Scheduling Modules are Extended SOP Class attributes and are not part of the Modality Worklist Information Model.

*syngo* Dynamics Server will use the format 20010101-20011231 for date range matching.

*syngo* Dynamics Server requests the Return Key attributes listed in Table 3.1-11.

**Table 3.1-11:** Requested Return Key Attributes

| Module | Attribute Name | Tag | Notes |
|---|---|---|---|
| Scheduled Procedure Step | Scheduled Procedure Step Sequence | (0040,0100) | |
| | >Scheduled Station AE Title | (0040,0001) | |
| | >Scheduled Procedure Step Start Date | (0040,0002) | See note 1 |
| | >Scheduled Procedure Step Start Time | (0040,0003) | |
| | >Modality | (0008,0060) | See note 1 |
| | >Scheduled Performing Physician's Name | (0040,0006) | |
| | >Scheduled Station Name | (0040,0010) | See note 1 |
| | >Comments on the Scheduled Procedure Step | (0040,0400) | |

| Module | Attribute Name | Tag | Notes |
|---|---|---|---|
| Requested Procedure | Requested Procedure ID | (0040,1001) | |
| | Requested Procedure Description | (0032,1060) | |
| | Requested Procedure Code Sequence | (0032,1064) | |
| | >Code Value | (0008,0100) | |
| | >Coding Scheme Designator | (0008,0102) | |
| | >Code Meaning | (0008,0104) | |
| | Study Instance UID | (0020,000d) | |
| | Reason for the Requested Procedure | (0040,1002) | |
| | Requested Procedure Comments | (0040,1400) | |
| Imaging Service Request | Accession Number | (0008,0050) | See note 1 |
| | Referring Physician's Name | (0008,0090) | |
| | Reason for Imaging Service Request | (0040,2001) | |
| | Imaging Service Request Comments | (0040,2400) | |
| Visit Identification | Admission ID | (0038,0010) | |
| Visit Status | Current Patient Location | (0038,0300) | |
| Visit Relationship | Referenced Patient Sequence | (0008,1120) | |
| | >Referenced SOP Instance UID | (0008,1155) | |
| Patient Identification | Patient's Name | (0010,0010) | See note 1 |
| | Patient ID | (0010,0020) | See note 1 |
| | Other Patient IDs | (0010,1000) | |
| | Patient's Birth Date | (0010,0030) | |
| | Patient's Sex | (0010,0040) | |
| | Patient's Age | (0010,1010) | |
| | Military Rank | (0010,1080) | |
| | Branch of Service | (0010,1081) | |
| Study Classification | Study Status ID | (0032,000a) | See note 1 |
| | Study Priority ID | (0032,000c) | |
| Study Scheduling | Requesting Physician | (0032,1032) | |
| | Requesting Service | (0032,1033) | |

**Note 1:** These attributes are available as query criteria in the Study Fixing interface.

### 3.1.2.7 Real-World Activity – Study Update

**Associated Real-World Activity – Study Update**
*syngo* Dynamics Server can update a remote AE when a study has been completed. *syngo* Dynamics Server will establish an association automatically to update study status based on configuration rules.

**Proposed Presentation Contexts – Study Update**
*syngo* Dynamics Server will propose the Presentation Contexts shown in Table 3.1-12.

**Table 3.1-12:** Proposed Presentation Contexts – Study Update

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Study Component Management | 1.2.840.10008.3.1.2.3.2 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCU | None |
| Basic Study Content Notification | 1.2.840.10008.1.9 | | | |
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | | | |

**SOP Specific Conformance – Study Update**
*syngo* Dynamics Server provides standard conformance to the DICOM Study Content Notification and partial conformance to the Study Component Management Service Classes as an SCU. The Study Component Management is not conformant to PS3.4, however it is included in this document since some remote AEs do provide support for the *syngo* Dynamics implementation.

*syngo* Dynamics Server will attempt to use Study Component Management over Basic Study Content Notification if both SOP classes are supported by the remote AE.

MPPS notifications are configurable in the user interface.

**Study Component Management – Operations**
*syngo* Dynamics Server can create an instance of the Study Component SOP and provide information about a specific real-world Study using the DIMSE N-CREATE Service.

*syngo* Dynamics Server does not provide the following Type1 Attributes:

- Referenced Study Sequence (0008,1110)
  - >Referenced SOP Class UID (0008,1150)
  - >Referenced SOP Instance UID (0008,1155)
- Procedure Code Sequence (0008,1032)
  - >Code Value (0008,1032)
  - >Coding Scheme Designator (0008,0102)
  - >Code Meaning (0008,0104)

*syngo* Dynamics Server will include the following Private Data Element:

- Tag (0003,3000)
- Name Patient Instance UID
- VR UI
- VM 1

*syngo* Dynamics will provide the Attribute Values listed in Table 3.1-13.

**Table 3.1-13:** Study Component Management N-CREATE Attributes

| Attribute name | Tag | Attribute name | Tag |
|---|---|---|---|
| Specific Character Set | (0008,0005) | Patient ID | (0010,0020) |
| Modality | (0008,0060) | Patient's Birth Date | (0010,0030) |
| Study Component Status ID | (0032,1055) | Patient's Sex | (0010,0040) |
| Study Description | (0008,1030) | Other Patient IDs | (0010,1000) |
| Study ID | (0020,0010) | Study Instance UID | (0020,000D) |
| Study Date | (0008,0020) | Acquisition In Study | (0020,1004) |
| Study Time | (0008,0030) | Study Status ID | (0032,000A) |
| Accession Number | (0008,0050) | Study Priority ID | (0032,000C) |
| Retrieve AE Title | (0008,0054) | Requesting Physician | (0032,1032) |
| Institution Name | (0008,0080) | Study Completion Date | (0032,1050) |
| Referring Physician's Name | (0008,0090) | Study Completion Time | (0032,1051) |
| Station Name | (0008,1010) | Current Patient Location | (0038,0300) |
| Institutional Department Name | (0008,1040) | Requested Procedure ID | (0040,1001) |
| Patient's Name | (0010,0010) | Patient Instance UID | (0003,3000) |

**Basic Study Content Notification**
*syngo* Dynamics Server can issue a Basic Study Content Notification to a remote AE using the DIMSE N-CREATE Service to identify the change in study status.

- *syngo* Dynamics Server processes all Successful Response Status Code shown in Table 3.1-14 identically.
- *syngo* Dynamics Server includes the Basic Study Descriptor IOD Attributes shown in Table 3.1-15.
- *syngo* Dynamics Server always includes the Type 2C Elements indicated in Table 3.1 15 as part of the C-Store.
- *syngo* Dynamics Server includes the Attribute Accession Number (0008,0050) that is not part of the Basic Study Creator IOD.

**Table 3.1-14:** Study Content Notification Response Statuses

| Service Status | Further Meaning | Response Status Codes |
|---|---|---|
| Success | Complete Study Content exists on system supporting SCP | 0000 |
| Success | Partial Study Content exists on system supporting SCP | 0001 |
| Success | None of the Study Content exists on system supporting SCP | 0002 |
| Success | It is unknown whether or not study content exists on system supporting SCP | 0003 |
| Failed | Failed Operation | Cxxx |

**Table 3.1-15:** Basic Study Content Notification N-CREATE Attributes

| Module | Attribute Name | Tag | Notes |
|---|---|---|---|
| Patient Summary | Patient's Name | (0010,0010) | |
| | Patient ID | (0010,0020) | |
| Study Content | Study ID | (0020,0010) | |
| | Study Instance UID | (0020,000D) | |
| | Referenced Series Sequence | (0008,1115) | |
| | >Series Instance UID | (0020,000E) | |
| | >Retrieve AE Title | (0008,0054) | Type 2C |
| | >Referenced Image Sequence | (0008,1140) | |
| | >Retrieve AE Title | (0008,0054) | Type 2C |
| | >Referenced SOP Class UID | (0008,1150) | |
| | >Referenced SOP Instance UID | (0008,1155) | |
| SOP Common | SOP Class UID | (0008,0016) | |
| | SOP Instance UID | (0008,0018) | |
| | Accession Number | (0008,0050) | Not part of IOD |

**Modality Performed Procedure Step**
*syngo* Dynamics Server can create a Modality Performed Procedure Step instance on a remote AE using the DIMSE N-CREATE Service to identify the change in study status. This provides support to modalities without native MPPS support.

*syngo* Dynamics will create a Modality Performed Procedure Step SOP Instance for a specified source if configured through the graphical user interface.

Since *syngo* Dynamics Server only creates the SOP Instance when a study has been sent for storage, the status of DISCONTINUED is never used.

*syngo* Dynamics will provide the N-CREATE Attributes Values shown in Table 3.1-16. These values are obtained from information contained within the image object.

*syngo* Dynamics will provide the N-SET Attributes Values shown in Table 3.1-17.

**Table 3.1-16:** Modality Performed Procedure Step N-CREATE Attributes

| Module | Attribute Name | Tag | Notes |
|---|---|---|---|
| PPS Relationship | Patient's Name | (0010,0010) | |
| | Patient ID | (0010,0020) | |
| | Patient's Birth Date | (0010,0030) | |
| | Patient's Sex | (0010,0040) | |
| | Referenced Patient Sequence | (0008,1120) | Empty |
| | Scheduled Step Attribute Sequence | (0040,0270) | |
| | >Study Instance UID | (0020,000D) | |
| | >Referenced Study Sequence | (0008,1110) | Empty |
| | >Accession Number | (0008,0050) | |
| | >Requested Procedure ID | (0040,1001) | |
| | >Requested Procedure Description | (0032,1060) | |
| | >Scheduled Procedure Step ID | (0040,0007) | |
| | >Scheduled Procedure Step Description | (0008,0054) | |
| | >Scheduled Action Item Code Sequence | (0040,0008) | Empty |

| Module | Attribute Name | Tag | Notes |
|---|---|---|---|
| PPS Information | Performed Station AE Title | (0040,0241) | |
| | Performed Station Name | (0040,0242) | |
| | Performed Location | (0040,0243) | Null Value |
| | Performed Procedure Step Start Date | (0040,0244) | |
| | Performed Procedure Step Start Time | (0040,0245) | |
| | Performed Procedure Step ID | (0040,0253) | |
| | Performed Procedure Step End Date | (0040,0250) | Null Value |
| | Performed Procedure Step End Time | (0040,00251) | Null Value |
| | Performed Procedure Step Status | (0040,0252) | IN PROGRESS |
| | Performed Procedure Step Description | (0040,0254) | |
| | Performed Procedure Type Description | (0040,0255) | |
| | Procedure Code Sequence | (0008,1032) | Empty |
| Image Acquisition Results | Modality | (0008,0060) | |
| | Study ID | (0020,0010) | |
| | Performed Action Item Sequence | (0040,0260) | Empty |
| | Performed Series Sequence | (0040,0340) | |
| | >Performing Physician's Name | (0008,1050) | |
| | >Operators' Name | (0008,1070) | |
| | >Protocol Name | (0018,1030) | |
| | >Series Instance UID | (0020,000E) | |
| | >Series Description | (0008,1030) | |
| | >Retrieve AE Title | (0008,0054) | |
| | >Referenced Image Sequence | (0008,1140) | |
| | >Referenced SOP Class UID | (0008,1150) | |
| | >Referenced SOP Instance UID | (0008,1155) | |
| | >Referenced Standalone SOP Instance Sequence | (0040,0220) | |
| | >Referenced SOP Class UID | (0008,1150) | |
| | >Referenced SOP Instance UID | (0008,1155) | |

**Table 3.1-17:** Modality Performed Procedure Step N-SET Attributes

| Module | Attribute Name | Tag | Notes |
|---|---|---|---|
| | Performed Procedure Step End Date | (0040,0250) | |
| | Performed Procedure Step End Time | (0040,00251) | |
| | Performed Procedure Step Status | (0040,0252) | COMPLETED |
| Image Acquisition Results | Performed Series Sequence | (0040,0340) | |
| | >Performing Physician's Name | (0008,1050) | |
| | >Operators' Name | (0008,1070) | |
| | >Protocol Name | (0018,1030) | |
| | >Series Instance UID | (0020,000E) | |
| | >Series Description | (0008,1030) | |
| | >Retrieve AE Title | (0008,0054) | *syngo* Dynamics Server AE Title |
| | >Referenced Image Sequence | (0008,1140) | |
| | >Referenced SOP Class UID | (0008,1150) | |
| | >Referenced SOP Instance UID | (0008,1155) | |
| | >Referenced Standalone SOP Instance Sequence | (0040,0220) | |
| | >Referenced SOP Class UID | (0008,1150) | |
| | >Referenced SOP Instance UID | (0008,1155) | |

## 3.1.3 Information Object Implementation

### 3.1.3.1 Grayscale Softcopy Presentation State IOD

This section describes the Grayscale Softcopy Presentation State IODs which are created by this implementation. Attributes which are not mentioned in the Table below are not created by this implementation. There is one PR object for each image with image adornments.

Presentation State objects are never read by the application (receiving is only supported for archive purposes).

**Table 3.1-18:** Grayscale Softcopy Presentation State IODs

| Attribute Name | Attribute Tag | Type | VR | VM | Module | Value |
|---|---|---|---|---|---|---|
| Specific Character Set | (0008,0005) | 1C | CS | 1-n | SOP Common | 'ISO_IR 100' |
| Instance Creation Date | (0008,0012) | 3 | DA | 1 | SOP Common | Creation/modification date |
| Instance Creation Time | (0008,0013) | 3 | TM | 1 | SOP Common | Creation/modification time |
| SOP Class UID | (0008,0016) | 1 | UI | 1 | SOP Common | '1.2.840.10008.5.1.4.1.1.11.1' |
| SOP Instance UID | (0008,0018) | 1 | UI | 1 | SOP Common | Created/reused (in case of an image adornment modification) |
| Study Date | (0008,0020) | 2 | DA | 1 | General Study | From study |
| Study Time | (0008,0030) | 2 | TM | 1 | General Study | From study |
| Accession Number | (0008,0050) | 2 | SH | 1 | General Study | From study |
| Modality | (0008,0060) | 1 | CS | 1 | Presentation Series | 'PR' |
| Manufacturer | (0008,0070) | 2 | LO | 1 | General Equipment | 'Siemens Medical Solutions' |
| Referring Physician's Name | (0008,0090) | 2 | PN | 1 | General Study | From study |
| Station Name | (0008,1010) | 3 | SH | 1 | General Equipment | From referenced image |
| Referenced Series Sequence | (0008,1115) | 1 | SQ | 1 | Presentation State | See below |
| > Referenced Image Sequence | (0008,1115)<br>(0008,1140) | 1C | SQ | 1 | Presentation State | See below |
| >> Referenced SOP Class UID | (0008,1115)<br>(0008,1140)<br>(0008,1150) | 1C | UI | 1 | Presentation State | From referenced image |
| >> Reference SOP Instance UID | (0008,1115)<br>(0008,1140)<br>(0008,1155) | 1C | UI | 1 | Presentation State | From referenced image |
| >> Referenced Frame Number | (0008,1115)<br>(0008,1140)<br>(0008,1160) | 1C | IS | 1-n | Presentation State | From referenced image or all frames (user choice) |
| > Series Instance UID | (0008,1115)<br>(0020,000E) | 1C | UI | 1 | Presentation State | From referenced image |
| Patient's Name | (0010,0010) | 2 | PN | 1 | Patient | From study |
| Patient ID | (0010,0020) | 2 | LO | 1 | Patient | From study |
| Patient's Birth | (0010,0030) | 2 | DA | 1 | Patient | From study |
| Patient's Sex | (0010,0040) | 2 | CS | 1 | Patient | From study |

| Attribute Name | Attribute Tag | Type | VR | VM | Module | Value |
|---|---|---|---|---|---|---|
| Study Instance UID | (0020,000D) | 1 | UI | 1 | General Study | From study |
| Series Instance UID | (0020,000E) | 1 | UI | 1 | General Series | Created (all PR objects of the study will have the same value) |
| Study ID | (0020,0010) | 2 | SH | 1 | General Study | From study |
| Series Number | (0020,0011) | 2 | IS | 1 | General Series | '777' (configuration value) |
| Instance Number | (0020,0013) | 1 | IS | 1 | Presentation State | From referenced image |
| Rescale Intercept | (0028,1052) | 1C | DS | 1 | Modality LUT | From referenced image |
| Rescale Slope | (0028,1053) | 1C | DS | 1 | Modality LUT | From referenced image |
| Rescale Type | (0028,1054) | 1C | LO | 1 | Modality LUT | From referenced image or US |
| >LUT Descriptor | (0028,3000) | 1C | US/SS | 3 | Modality LUT | From referenced image |
| Modality LUT Sequence | (0028,3000) | 1C | SQ | 1 | Modality LUT | See below |
| >LUT Explanation | (0028,3000) (0028,3003) | 3 | LO | 1 | Modality LUT | From referenced image |
| >Modality LUT Type | (0028,3000) (0028,3004) | 1C | LO | 1 | Modality LUT | From referenced image |
| >LUT Data | (0028,3000) (0028,3006) | 1C | OW/US/SS | 1-n | Modality LUT | From referenced image |
| Softcopy VOI LUT Sequence | (0028,3110) | 1 | SQ | 1 | Softcopy VOI LUT | See below |
| >Referenced Image Sequence | (0028,3110) (0008,1140) | 1C | SQ | 1 | Softcopy VOI LUT | See below |
| >>Referenced SOP Class UID | (0028,3110) (0008,1140) (0008,1150) | 1C | UI | 1 | Softcopy VOI LUT | From referenced image |
| >>Referenced SOP Instance UID | (0028,3110) (0008,1140) (0008,1155) | 1C | UI | 1 | Softcopy VOI LUT | From referenced image |
| >>Referenced Frame Number | (0028,3110) (0008,1140) (0008,1160) | 1C | IS | 1-n | Softcopy VOI LUT | All frames |
| >Window Center | (0028,3110) (0028,1051) | 1C | DS | 1-n | Softcopy VOI LUT | From referenced image |
| >Window Width | (0028,3110) (0028,1051) | 1C | DS | 1-n | Softcopy VOI LUT | From referenced image |

| Attribute Name | Attribute Tag | Type | VR | VM | Module | Value |
|---|---|---|---|---|---|---|
| >VOI LUT Sequence | (0028,3110)<br>(0028,3010) | 1C | SQ | 1 | Softcopy VOI LUT | See below |
| >>LUT Descriptor | (0028,3110)<br>(0028,3010)<br>(0028,3002) | 1C | US/<br>SS | 3 | Softcopy VOI LUT | From referenced image |
| >>LUT Explanation | (0028,3110)<br>(0028,3010)<br>(0028,3003) | 3 | LO | 1 | Softcopy VOI LUT | From referenced image |
| >>LUT Data | (0028,3110)<br>(0028,3010)<br>(0028,3006) | 1C | OW/<br>US/<br>SS | 1-n | Softcopy VOI LUT | From referenced image |
| Graphic Annotation Sequence | (0070,0001) | 1 | SQ | 1 | Graphic Annotation | Graphic and text elements required to describe the image adornments in graphic layer 'ADORNMENTS BLACK' and 'ADORNMENTS WHITE' measurement values are displayed in the top left corner of the image – to ensure readability a under laying frame can be configured |
| Displayed Area Selection SQ | (0070,005A) | 1 | SQ | 1 | Displayed Area | See below |
| >Displayed Area Top Left Hand Corner | (0070,005A)<br>(0070,0052) | 1 | SL | 2 | Displayed Area | 0\0 |
| >Displayed Area Bottom Right Hand Corner | (0070,005A)<br>(0070,0053) | 1 | SL | 2 | Displayed Area | (0028,0010) and (0028,0011) from referenced image |
| >Presentation Size Mode | (0070,005A)<br>(0070,0100) | 1 | CS | 1 | Displayed Area | 'SCALE TO FIT' |
| >Presentation Pixel Aspect Ratio | (0070,005A)<br>(0070,0102) | 1C | IS | 2 | Displayed Area | (0018,1166) from referenced image or (0028,0030) from referenced image or 1\1 |
| Graphic Layer Sequence | (0070,0060) | 1 | SQ | 1 | Graphic Layer | 4 layers ('ADORNMENTS BLACK', 'ADORNMENTS WHITE', 'CURVE' and 'OVERLAY') |
| Presentation Label | (0070,0080) | 1 | CS | 1 | Presentation State | 'SYNGO DYNAMICS' |
| Presentation Description | (0070,0081) | 2 | LO | 1 | Presentation State | 'Image Adornments' |
| Presentation Creation Date | (0070,0082) | 1 | DA | 1 | Presentation State | Creation/modification date |

| Attribute Name | Attribute Tag | Type | VR | VM | Module | Value |
|---|---|---|---|---|---|---|
| Presentation Creation Time | (0070,0083) | 1 | TM | 1 | Presentation State | Creation/modification time |
| Presentation Creator's Name | (0070,0084) | 2 | PN | 1 | Presentation State | User currently logged in or application name (if created in batch mode) |
| Presentation LUT Shape | (2050,0020) | 1C | CS | 1 | Softcopy Presentation LUT | 'IDENTITY' |
| Curve Activation Layer | (50xx,1001) | 2C | CS | 1 | Overlay/Curve Activation | 'CURVE' (only if group 50xx is present in the referenced image with a curve of type POLY or ROI) |
| Overlay Activation Layer | (60xx,1001) | 2C | CS | 1 | Overlay/Curve Activation | 'OVERLAY' (only if group 60xx is present in the referenced image) |

**Note:**
Following modules not supported:

- Bitmap Display Shutter
- Display Shutter
- Mask
- Overlay Pane Module
- Patient Study
- Spatial Transformation

## 3.1.4 Association Acceptance Policy

*syngo* Dynamics Server accepts associations for the following real-world activities:

- Verify Communication
- Store Objects
- Request Storage Commitment
- Find Object
- Move Object
- Unsolicited Notifications
- Study Updates

Association requests from unknown Application Entities will be rejected by *syngo* Dynamics Server.

### 3.1.4.1 Real-World Activity – Verify Communication

**Associated Real-World Activity – Verify Communication**
*syngo* Dynamics Server will respond to communication verification requests from a remote AE.

**Accepted Presentation Contexts – Verify Communication**
*syngo* Dynamics Server will accept the Presentation Contexts shown in Table 3.1-19.

**Table 3.1-19:** Accepted Presentation Contexts – Verify Communication

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | | |
|---|---|---|---|---|---|
| **Name** | **UID** | **Name** | **UID** | **Role** | **Extended Negotiation** |
| Verification | 1.2.840.10008.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |

**SOP Specific Conformance – Verify Communication**
*syngo* Dynamics Server provides standard conformance to the DICOM Verification Service Class as an SCP.

**Presentation Context Acceptance Criterion – Verify Communication**
*syngo* Dynamics Server will only accept the Presentation Context listed in Table 3.1-19.

### 3.1.4.2 Real-World Activity – Store Objects

**Associated Real-World Activity – Store Objects**
A remote AE can send objects to *syngo* Dynamics Server for storage. Objects received by *syngo* Dynamics Server can be retrieved at a later time, unless excluded.
The access time to retrieve the objects varies depending on object location. *syngo* Dynamics Server maintains four object states.

- ONLINE – Objects can be immediately retrieved from *syngo* Dynamics Server.
- NEARLINE – Objects can be retrieved from *syngo* Dynamics Server, however additional processing time is required.
- PACS – Objects can be retrieved from the PACS AE used for archiving; however additional processing time may be required for the PACS to respond with the study data.

**Accepted Presentation Contexts – Store Objects**
*syngo* Dynamics Server will accept the Presentation Contexts shown in Table 3.1-20.

**Table 3.1-20:** Accepted Presentation Contexts – Store Objects

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | Role | Extended Negotiation |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | | |
| Computed Radiography Image Storage | 1.2.840.10008.5.1.4.1.1.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Digital X-Ray Image Storage – For Presentation | 1.2.840.10008.5.1.4.1.1.1.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Digital X-Ray Image Storage – For Processing | 1.2.840.10008.5.1.4.1.1.1.1.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| CT Image Storage | 1.2.840.10008.5.1.4.1.1.2 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Ultrasound Multi-frame Image Storage (Retired) | 1.2.840.10008.5.1.4.1.1.3 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | Role | Extended Negotiation |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | | |
| MR Image Storage | 1.2.840.10008.5.1.4.1.1.4 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Ultrasound Multi-frame Image Storage | 1.2.840.10008.5.1.4.1.1.3.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70<br>RLE Lossless 1.2.840.10008.1.2.5 | SCP | None |
| Ultrasound Image Storage (Retired) | 1.2.840.10008.5.1.4.1.1.6 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Ultrasound Image Storage | 1.2.840.10008.5.1.4.1.1.6.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70<br>RLE Lossless 1.2.840.10008.1.2.5 | SCP | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Multi-frame Single Bit Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Multi-frame Grayscale Byte Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.2 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Multi-frame Grayscale Word Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.3 | 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Multi-frame True Color Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.4 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| 12-lead ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| General ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.2 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Ambulatory ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.3 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Hemodynamic Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.2.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Cardiac Electrophysiology Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.3.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Basic Voice Audio Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.4.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| X-Ray Angiographic Image Storage | 1.2.840.10008.5.1.4.1.1.12.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless Baseline (Process 1) 1.2.840.10008.1.2.4.50<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Nuclear Medicine Image Storage | 1.2.840.10008.5.1.4.1.1.20 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Raw Data Storage | 1.2.840.10008.5.1.4.1.1.66 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1 RLE Lossless 1.2.840.10008.1.2.5<br>JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70 | SCP | None |
| Basic Text SR | 1.2.840.10008.5.1.4.1.1.88.11 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Enhanced SR | 1.2.840.10008.5.1.4.1.1.88.22 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Comprehensive SR | 1.2.840.10008.5.1.4.1.1.88.33 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| X-Ray Radiation Dose SR | 1.2.840.10008.5.1.4.1.1.88.67 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70 | SCP | None |
| Positron Emission Tomography Image Storage | 1.2.840.10008.5.1.4.1.1.128 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless, Non-Hierarchical (Process 14) 1.2.840.10008.1.2.4.57<br>JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70 | SCP | None |
| Surface Segmentation Objects | 1.2.840.10008.5.1.4.1.1.66.5 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70 | SCP | None |
| Registration objects | 1.2.840.10008.5.1.4.1.1.66.1 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1<br>JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70 | SCP | None |

*syngo* Dynamics Server supports Extended Negotiations for the Storage Service Class. *syngo* Dynamics will supply the Sub Items shown in Table 3.1-21.

**Table 3.1-21:** Extended Negotiation – Store Objects

| Filed Name | Value | Description of Field |
|---|---|---|
| Level of Support | 2 | Level 2 (Full) SCP |
| Element Coercion | 0 | Does not coerce any Data Elements |

**SOP Specific Conformance – Store Objects**
*syngo* Dynamics Server provides conformance to the DICOM Storage Service Class as a Level 2 (Full) SCP.

No optional elements are discarded. All Type 1, Type 2 and Type 3 attributes will be retained. Private attributes will be stored and included when the object is sent out again. *syngo* Dynamics Server can decompress lossy compressed images and send them in uncompressed format. The Attribute Lossy Image Compression (0028,2110) remains "01".

The *syngo* Dynamics server generally stores all objects in the transfer syntax that was proposed and used in the C STORE operation. A user setting does exist that will convert an object sent using an uncompressed transfer syntax into JPEG Lossless 1.2.840.10008.1.2.4.70 transfer syntax for internal storage. The photometric interpretation is not modified.

(0028, 0100) and (0028, 0101) Bits Allocated and Bits Stored: Objects with tag values of Bits Allocated = 16 / Bits Stored = 8, will be stored as uncompressed by the *syngo* Dynamics server.

Upon successful storage of objects contained within a study the study can be automatically transferred to a remote AE or returned in response to a retrieval request. *syngo* Dynamics Server can be configured to automatically archive or delete objects contained within a study. Studies may be manually transferred, archived or deleted through the graphical user interface. Note that when an object gets transferred out of *syngo* Dynamics by any of the above-mentioned methods, the Institutional Name (0008,0080) and the Institutional Department Name (0008,1040) are set to reflect the Institutional Name and Department on *syngo* Dynamics.

When an object is received that has a SOP Instance UID (0008,0018), Study Instance UID (0020,000D) and Series Instance UID (0020,000E) of an object that is already present on *syngo* Dynamics Server the existing object will be overwritten. When an object is received that has the same SOP Instance UID but different Study Instance UID and Series Instance UID of an object that is already present on *syngo* Dynamics Server, the new object will be assigned a new SOP Instance UID by *syngo* Dynamics Server.

*syngo* Dynamics Server can be configured to lock an existing study after it has been marked as READ. *syngo* Dynamics Server will not accept new objects and return an Error status. The user will be notified.

*syngo* Dynamics Server will return the C-STORE status codes shown in Table 3.1-22.

**Table 3.1-22:** C-STORE Status Codes

| Service status | Further meaning | Status codes | Description |
|---|---|---|---|
| Refused | Out of resources | A700 | Indicates that there was not enough storage space to store the image. Recovery from this condition is left to the administrative functions. |
| | SOP Class not supported | A800 | Indicates that the SOP Class of the Image in the C-STORE operation did not match the Abstract Syntax negotiated for the Presentation Context. |
| Error | Data set does not match SOP Class | A900 | Indicates that the Data Set does not encode an instance of the SOP Class specified. |
| | Failed | C000 | The operation was not successful. |
| | Unable to register object, study locked; no new objects allowed | C005 | Indicates that no new objects can be added to this study because it has been locked. |
| | Cannot understand | C005 | Indicates that the Data Set cannot be parsed into elements. |
| Warning | Data set does not match SOP Class | B007 | Indicates that the Data Set does not match the SOP Class, but that the image was stored anyway. |
| | Duplicate SOP Instance UID | D000 | Indicates that the SOP Instance UID of the specified image is already stored in the database. |
| Success | Success | 0000 | Operation performed properly. |

If HIS Verification is enabled, *syngo* Dynamics Server may modify the values of certain Attributes to match the values maintained by the HIS/RIS. *syngo* Dynamics Server will issue a Modality Worklist query and modify the values indicated in Table 3.1-23.

**Table 3.1-23:** Modality Worklist to DICOM IOD Mapping

| MWL Attribute Name | MWL Tag | Object Attribute Tag | Object Tag | Overwrite Values | Overwrite Nulls |
|---|---|---|---|---|---|
| Accession Number | (0008,0050) | Accession Number | (0008,0050) | Yes | |
| Referring Physician Name | (0008,0090) | Referring Physician Name | (0008,0090) | Yes | |
| Referenced Patient Sequence | (0008,1120) | | | Yes | |
| >Referenced SOP Instance UID | (0008,1155) | Patient SOP Instance UID[1] | (0003,3000) | Yes | |
| Patient's Name | (0010,0010) | Patient's Name | (0010,0010) | Yes | |
| Patient ID | (0010,0020) | Patient ID | (0010,0020) | Yes | |
| Patient's Birth Date | (0010,0030) | Patient's Birth Date | (0010,0030) | Yes | |
| Patient's Sex | (0010,0040) | Patient's Sex | (0010,0040) | Yes | |
| Other Patient IDs | (0010,1000) | Other Patient IDs | (0010,1000) | Yes | |
| Patient's Age | (0010,1010) | Patient's Age | (0010,1010) | Yes | |
| Military Rank | (0010,1080) | Military Rank | (0010,1080) | Yes | |
| Branch of Service | (0010,1081) | Branch of Service | (0010,1081) | Yes | |
| Study Instance UID | (0020,000D) | Study Instance UID | (0020,000D) | Yes | |
| Study Status ID | (0032,000A) | Study Status ID | (0032,000A) | Yes | |
| Study Priority ID | (0032,000C) | Study Priority ID | (0032,000C) | Yes | |
| Requesting Physician | (0032,1032) | Requesting Physician | (0032,1032) | Yes | |
| Requesting Service | (0032,0033) | Requesting Service | (0032,0033) | Yes | |
| Requested Procedure Description | (0032,1060) | Study Description[2] | (0008,1030) | No* | Yes |
| Requested Procedure Code Sequence | (0032,1064) | | | | |
| >Code Value | (0008,0100) | Code Value | (0008,0100) | Yes | |
| >Code Meaning | (0008,0104) | Study Description[2] | (0008,1030) | No* | Yes |

| MWL Attribute Name | MWL Tag | Object Attribute Tag | Object Tag | Overwrite Values | Overwrite Nulls |
|---|---|---|---|---|---|
| Current Patient Location | (0038,0300) | Current Patient Location | (0038,0300) | No* | Yes |
| Scheduled Procedure Step Sequence | (0040,0100) | | | | |
| >Modality | (0008,0060) | Modality | (0008,0060) | No | No |
| >Scheduled Procedure Step Start Date | (0040,0002) | Study Date | (0008,0020) | No | Yes |
| > Scheduled Procedure Step Start Time | (0040,0003) | Study Time | (008,0030) | No | Yes |
| >Scheduled Performing Physician's Name | (0040,0006) | Performing Physician's Name | (0008,1050) | Yes | |
| >Scheduled Station Name | (0040,0010) | Station Name | (0008,1010) | No | Yes |
| >Comments on the Scheduled Procedure Step | (0040,0400) | Study Comments[3] | (0032, 4000) | No* | Yes |
| Requested Procedure ID | (0040,1001) | Requested Procedure ID | (0040,1001) | Yes | |
| Reason for the Requested Procedure | (0040,1002) | Additional Patient History Reason for Study[4] | (0010,21B0) (0032,1030) | No | Yes |
| Requested Procedure Comments | (0040,1400) | Study Comments[3] | (0032,4000) | No* | Yes |
| Reason for the Imaging Service Request | (0040,2001) | Additional Patient History Reason for Study[4] | (0010,21B0) (0032,1030) | No | Yes |
| Imaging Service Request Comments | (0040,2400) | Study Comments[3] | (0032, 4000) | No* | Yes |

**Notes:**

** Default Overwrite Value behavior. This behavior can be changed through configuration.*

*[2] Order used to search for Study Description: First non-null value from Requested Procedure Description or Code Meaning.*

*[4] Order used to search for Additional Patient History and Reason for Study: First non-null value from Reason for the Requested Procedure or Reason for the Imaging Service Request.*

*[3] Order used to search for Study Comments: First non-null value from Comments on the Scheduled Procedure Step, Requested Procedure Comments or Imaging Service Request Comments.*

*[1] Patient SOP Instance UID is a Private Data Element maintained by syngo Dynamics Server.*

**Presentation Context Acceptance Criterion – Store Objects**
*syngo* Dynamics Server will accept any number of Storage Presentation Contexts shown in Table 3.1-19 per association request. Any one Abstract Syntax may be specified more than once in an association request if the transfer syntaxes differ between Presentation Contexts.

**Transfer Syntax Selection Policies**
*syngo* Dynamics Server will prefer a compressed Transfer Syntax over an uncompressed Transfer Syntax. Lossless Compression is preferred over Lossy Compression and Explicit VR Little Endian is preferred over Implicit VR Little Endian.

### 3.1.4.3 Real-World Activity – Request Storage Commitment

**Associated Real-World Activity – Request Storage Commitment**
*syngo* Dynamics Server stores objects sent by a remote AE. The remote AE can transmit a Storage Commitment Request with a list of references to one or more SOP Instances. *syngo* Dynamics Server will return a Storage Commitment Result to the remote AE.

**Accepted Presentation Contexts – Request Storage Commitment**
*syngo* Dynamics Server will accept the Presentation Contexts shown in Table 3.1-24.

**Table 3.1-24:** Accepted Presentation Contexts – Request Storage Commitment

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | | |
|---|---|---|---|---|---|
| **Name** | **UID** | **Name** | **UID** | **Role** | **Extended Negotiation** |
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |

**SOP Specific Conformance – Request Storage Commitment**
*syngo* Dynamics Server provides partial conformance to the DICOM Storage Commitment Service Class as an SCP.

**Request Storage Commitment – Operations**
*syngo* Dynamics Server will store SOP Instances indefinitely unless the instances are manually deleted by a user with appropriate system permissions. The capacity is limited only by the availability of archive storage and volatility is dependent on the archive medium used. *syngo* Dynamics Server will stop accepting new objects for storage to ensure the availability of objects for which a successful storage commitment response has been sent. *syngo* Dynamics Server can be configured not to archive objects received from a remote AE. A successful storage commitment request will be returned to the remote AE; however, the persistence of storage will be dependent on the amount of storage capacity available on *syngo* Dynamics Server and disk management configuration settings of the system.

*syngo* Dynamics Server does not support the optional Storage Media and File-Set ID and UID Attributes in the N-ACTION. *syngo* Dynamics Server supports the Action Type and Action Information shown in Table 3.1-25.

**Table 3.1-25:** Storage Commitment Request – Action Information

| Action Type Name | Action Type ID | Attribute | Tag |
|---|---|---|---|
| Request Storage Commitment | 1 | Transaction UID | (0008,1195) |
| | | Referenced SOP Sequence | (0008,1199) |
| | | >Referenced SOP Class UID | (0008,1150) |
| | | >Referenced SOP Instance UID | (0008,1155) |
| | | Referenced Study Component Sequence | (0008,1111) |
| | | >Referenced SOP Class UID | (0008,1150) |
| | | >Referenced SOP Instance UID | (0008,1155) |

**Request Storage Commitment – Notifications**
*syngo* Dynamics Server will process the Storage Commitment Request determine if the SOP Instances have been successfully committed to storage. *syngo* Dynamics Server will generate a Storage Commitment Result that will always be sent on a separate association and includes references to the successfully and unsuccessfully stored SOP Instances.

*syngo* Dynamics Server does not support the optional Storage Media and File-Set ID and UID or Retrieve AE Title (0008,0054) Attributes in the N-EVENT-REPORT. *syngo* Dynamics Server supports the Event Type and Event Information shown in Table 3.1-26.

**Table 3.1-26:** Storage Commitment Result – Event Information

| Event Type Name | Event Type ID | Attribute | Tag |
|---|---|---|---|
| Storage Commitment Request Successful | 1 | Transaction UID | (0008,1195) |
| | | Referenced SOP Sequence | (0008,1199) |
| | | >Referenced SOP Class UID | (0008,1150) |
| | | >Referenced SOP Instance UID | (0008,1155) |
| | | Referenced Study Component Sequence | (0008,1111) |
| | | >Referenced SOP Class UID | (0008,1150) |
| | | >Referenced SOP Instance UID | (0008,1155) |

| Event Type Name | Event Type ID | Attribute | Tag |
|---|---|---|---|
| Storage Commitment Request Complete – Failures Exist | 2 | Transaction UID | (0008,1195) |
| | | Referenced SOP Sequence | (0008,1199) |
| | | >Referenced SOP Class UID | (0008,1150) |
| | | >Referenced SOP Instance UID | (0008,1155) |
| | | Failed SOP Sequence | (0008,1198) |
| | | >Referenced SOP Class UID | (0008,1150) |
| | | >Referenced SOP Instance UID | (0008,1155) |
| | | Referenced Study Component Sequence | (0008,1111) |
| | | >Referenced SOP Class UID | (0008,1150) |
| | | >Referenced SOP Instance UID | (0008,1155) |

**Presentation Context Acceptance Criterion – Request Storage Commitment**
*syngo* Dynamics Server will only accept the Presentation Context listed in Table 3.1-24.

**Transfer Syntax Selection Policies – Request Storage Commitment**
*syngo* Dynamics Server only supports Implicit VR Little Endian for this Real World Activity.

### 3.1.4.4 Real-World Activity – Find Object

**Associated Real World Activity – Find Object**
*syngo* Dynamics Server will respond to a query request by a remote AE. *syngo* Dynamics Server supports queries for composite objects at the Instance Level.

*syngo* Dynamics Server supports the query/retrieve services indicated in Table 3.1-27. The latency for retrieval of SOP Instances is dependent on the object state:

- ONLINE – Objects can be immediately retrieved from *syngo* Dynamics Server.
- NEARLINE – Objects can be retrieved from *syngo* Dynamics Server, however additional processing time is required.
- PACS – Objects can be retrieved from the *syngo* Dynamics Server however additional processing time is required for the data to be retrieved from the PACS.

*syngo* Dynamics Server can be configured to return results for objects with an ONLINE state only or all objects maintained in the *syngo* Dynamics Database regardless of state.

**Accepted Presentation Contexts – Find Object**
*syngo* Dynamics Server will accept the Presentation Contexts shown in Table 3.1-27.

**Table 3.1-27:** Accepted Presentation Contexts – Find Object

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended Negotiation |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | |
| Patient Root Query/Retrieve IM Find | 1.2.840.10008.5.1.4.1.2.1.1 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCP | Yes |
| Study Root Query/Retrieve IM Find | 1.2.840.10008.5.1.4.1.2.2.1 | | | |
| Patient/Study Only Query/Retrieve IM Find | 1.2.840.10008.5.1.4.1.2.3.1 | | | |

**SOP Specific Conformance – Find Object**

*syngo* Dynamics Server provides standard conformance to the DICOM Query/Retrieve Service Class as an SCP.

*syngo* Dynamics Server supports the Relational-queries extended SCP behavior. *syngo* Dynamics Server supports all mandatory Unique and Required Matching Keys. Case-insensitive matching for PN VR attributes is supported.

*syngo* Dynamics Server provides support for the Instance Availability (0008,0056) Data Element.

Attributes supported in the Patient Root Query are listed in Table 3.1-28.

**Table 3.1-28:** Patient Root Query Attributes

| Level | Description | Tag | Type |
|---|---|---|---|
| Patient | Patient's Name | (0010,0010) | R |
| Patient | Patient ID | (0010,0020) | U |
| Patient | Patient's Birth Date | (0010,0030) | O |
| Patient | Patient's Sex | (0010,0040) | O |
| Patient | Other Patient Ids | (0010,1000) | O |
| Patient | Patient Instance UID | (0003,3000) | O Note 1 |
| Patient | Current Patient Location | (0038,0300) | O Note 2 |
| Study | Study Date | (0008,0020) | R |
| Study | Study Time | (0008,0030) | R |
| Study | Accession Number | (0008,0050) | R |
| Study | Study ID | (0020,0010) | R |
| Study | Study Instance UID | (0020,000D) | U |
| Study | Modalities in Study | (0008,0061) | O |
| Study | Referring Physician's Name | (0008,0090) | O |
| Study | Study Description | (0008,1030) | O |

| Level | Description | Tag | Type |
|---|---|---|---|
| Study | Name of Physician(s) Reading Study | (0008,1060) | O |
| Study | Admitting Diagnoses Description | (0008,1080) | O |
| Study | Patient's Age | (0010,1010) | O |
| Study | Additional Patient History | (0010,21B0) | O |
| Study | Number of Study Related Instances | (0020,1208) | O |
| Study | Station Name | (0008,1010) | O Note 2 |
| Study | Performing Physician's Name | (0008,1050) | O Note 2 |
| Study | Study Status ID | (0032,000A) | O Note 2 |
| Study | Requesting Physician | (0032,1032) | O Note 2 |
| Series | Modality | (0008,0060) | R |
| Series | Series Number | (0020,0011) | R |
| Series | Series Instance UID | (0020,000E) | U |
| Series | Series Description | (0008,103E) | O |
| Series | Operator's Name | (0008,1070) | O |
| Series | Body Part Examined | (0018,0015) | O |
| Instance | Instance Number | (0020,0013) | R |
| Instance | SOP Instance UID | (0008,0018) | U |

**Note 1:** Patient Instance UID (0003,3000) is a Private Attribute requires Private Creator Name attribute, maintained by *syngo* Dynamics Server and can be returned by standard queries.

**Note 2:** These Attributes are not part of the Q/R Information Model.

*syngo* Dynamics Server supports the Relational-queries extended SCP behavior. The Attributes supported in the Study Root Query are listed in Table 3.1-29.

**Table 3.1-29:** Patient Root Query Attributes

| Level | Description | Tag | Type |
|---|---|---|---|
| Study | Study Date | (0008,0020) | R |
| Study | Study Time | (0008,0030) | R |
| Study | Accession Number | (0008,0050) | R |
| Study | Patient's Name | (0010,0010) | R |
| Study | Patient ID | (0010,0020) | R |
| Study | Study ID | (0020,0010) | R |

| Level | Description | Tag | Type |
|---|---|---|---|
| Study | Study Instance UID | (0020,000D) | U |
| Study | Modalities in Study | (0008,0061) | O |
| Study | Referring Physician's Name | (0008,0090) | O |
| Study | Study Description | (0008,1030) | O |
| Study | Name of Physician(s) Reading Study | (0008,1060) | O |
| Study | Admitting Diagnoses Description | (0008,1080) | O |
| Study | Patient's Birth Date | (0010,0030) | O |
| Study | Patient's Sex | (0010,1040) | O |
| Study | Other Patient Ids | (0010,1000) | O |
| Study | Patient's Age | (0010,1010) | O |
| Study | Additional Patient History | (0010,21B0) | O |
| Study | Number of Study Related Instances | (0020,1208) | O |
| Study | Patient Instance UID | (0003,3000) | O Note 1 |
| Study | Station Name | (0008,1010) | O Note 2 |
| Study | Performing Physician's Name | (0008,1050) | O Note 2 |
| Study | Study Status ID | (0032,000A) | O Note 2 |
| Study | Requesting Physician | (0032,1032) | O Note 2 |
| Study | Current Patient Location | (0038,0300) | O Note 2 |
| Series | Modality | (0008,0060) | R |
| Series | Series Number | (0020,0011) | R |
| Series | Series Instance UID | (0020,000E) | U |
| Series | Series Description | (0008,103E) | O |
| Series | Operator's Name | (0008,1070) | O |
| Series | Body Part Examined | (0018,0015) | O |
| Instance | Instance Number | (0020,0013) | R |
| Instance | SOP Instance UID | (0008,0018) | U |

**Note 1:** Patient Instance UID (0003,3000) is a Private Attribute maintained by *syngo* Dynamics Server that can be returned by standard queries.

**Note 2:** These Attributes are not part of the Q/R Information Model.

The Patient and Study Level Attributes in Table 3.1-28 are also supported for the Patient/Study Only Query/Retrieve.

*syngo* Dynamics Server will return the C-FIND status codes shown in Table 3.1-30.

**Table 3.1-30:** C-FIND Status Codes

| Service Status | Further Meaning | Status Codes | Description |
|---|---|---|---|
| Refused | Out of resources | A700 | |
| Failed | Identifier does not match SOP Class | A900 | |
| | Unable to Process | C001 | *syngo* Dynamics Server cannot process the request at this time. |
| Cancel | Matching terminated due to Cancel Request | FE00 | The original requester canceled this operation. |
| Pending | Pending | FF00 | All Optional Keys are supported in the same manner as Required Keys. |
| | Pending | FF01 | The matching operation is continuing. Warning that one or more Optional Keys were not supported in the same manner as Required. |
| Success | Success | 0000 | Operation performed properly. |

**Presentation Context Acceptance Criterion – Find Object**
*syngo* Dynamics Server will accept any of the Presentation Contexts listed in Table 3.1-27.

**Transfer Syntax Selection Policies – Find Object**
*syngo* Dynamics Server only supports Implicit VR Little Endian for this Real World Activity.

### 3.1.4.5 Real-World Activity – Move Object

**Associated Real World Activity – Move Object**
*syngo* Dynamics Server will respond to an object move request by a remote AE. *syngo* Dynamics Server supports move requests for composite objects at the Instance Level.

*syngo* Dynamics Server will establish a new Association with the Remote AE specified in the Move Destination for the C_STORE sub-operations. *syngo* Dynamics Server will propose the transfer syntax used when the object was initially accepted by the server and Implicit VR Little Endian. Actions specific to the C-STORE sub-operations are detailed in Section 3.1.2.2.

**Accepted Presentation Contexts – Move Object**
*syngo* Dynamics Server will accept the Presentation Contexts shown in Table 3.1-31.

**Table 3.1-31:** Accepted Presentation Contexts – Move Object

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Patient Root Query/Retrieve IM Move | 1.2.840.10008.5.1.4.1.2.1.2 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCP | Yes |
| Study Root Query/Retrieve IM Move | 1.2.840.10008.5.1.4.1.2.2.2 | | | |
| Patient/Study Only Query/ Retrieve IM Move | 1.2.840.10008.5.1.4.1.2.3.2 | | | |

**SOP Specific Conformance – Move Object**
*syngo* Dynamics Server provides standard conformance to the DICOM Query/Retrieve Service Class as an SCP.

*syngo* Dynamics Server supports the Relational-retrieval extended SCP behavior. *syngo* Dynamics Server supports C-STORE sub-operations for all Storage SOP Classes detailed in Section 3.1.2.2.

*syngo* Dynamics Server will return the C-MOVE status codes shown in Table 3.1-32.

**Table 3.1-32:** C-MOVE Status Codes

| Service Status | Further Meaning | Status Codes | Description |
|---|---|---|---|
| Refused | Out of resources | A701 | Unable to calculate number of matches. |
| | Out of Resources | A702 | Unable to perform storage of images to move destination. |
| Failed | Move Destination Unknown | A801 | The destination of this move request is unknown. |
| | Identifier does not match SOP Class | A900 | The specified identifier contains a request that does not match the specified SOP Class. |
| | Unable to Process | C002 | *syngo* Dynamics Server cannot process the request at this time. |
| Cancel | Sub-operations terminated due to Cancel Indication | FE00 | The original requester canceled this operation. |
| Warning | Sub-operations Complete – One or more Failures | B000 | Storage complete with one or more failures. |
| Pending | Sub-Operations are Continuing | FF00 | The Storage sub-operation is continuing. |
| | Sub-Operations are Continuing | FF02 | The Storage sub-operation is expected to require a long period of time to complete. The SCU may break the Association at any time but the operation will continue to completion. |
| Success | Success | 0000 | Operation performed properly. |

**Presentation Context Acceptance Criterion – Move Object**
*syngo* Dynamics Server will accept any of the Presentation Contexts listed in Table 3.1-31.

**Transfer Syntax Selection Policies – Move Object**
*syngo* Dynamics Server only supports Implicit VR Little Endian for this C-MOVE operation of this Real World Activity. *syngo* Dynamics Server will propose the transfer syntax used when the object was initially accepted by the server and Implicit VR Little Endian in the C-STORE sub-operation of the Real World Activity.

### 3.1.4.6 Real-World Activity – Unsolicited Notifications

**Associated Real World Activity – Unsolicited Notifications**
*syngo* Dynamics Server will accept unsolicited notifications from a remote AE.

**Accepted Presentation Contexts – Unsolicited Notifications**
*syngo* Dynamics Server will accept the Presentation Contexts shown in Table 3.1-33.

**Table 3.1-33:** Accepted Presentation Contexts – Unsolicited Notifications

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended Negotiation |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | |
| Detached Patient Management | 1.2.840.10008.3.1.2.1.1 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCU | No |
| Detached Visit Management | 1.2.840.10008.3.1.2.2.1 | | | |
| Detached Study Management | 1.2.840.10008.3.1.2.3.1 | | | |
| Detached Interpretation Management | 1.2.840.10008.3.1.2.6.1 | | | |

**SOP Specific Conformance – Unsolicited Notifications**
*syngo* Dynamics Server provides standard conformance to the DICOM Patient Management, Study Management and Results Management Service Classes as an SCU.

**Detached Patient Management – Notifications**
*syngo* Dynamics Server supports the DIMSE N-EVENT REPORT for the Event Types shown in Table 3.1-34. The Patient Created and Patient Deleted Event Types do not initiate any action by *syngo* Dynamics Server.

**Table 3.1-34:** Patient Notification Event Types

| Event Type Name | Event Type ID |
|---|---|
| Patient Created | 1 |
| Patient Deleted | 2 |
| Patient Updated | 3 |

When *syngo* Dynamics Server receives a Patient Updated Event Type, it will update all studies which are referenced by the Referenced Study Sequence (0008,1110) contained in the Data Set. If no Referenced Study Sequence is sent, *syngo* Dynamics Server will update all studies which contain the same Patient Instance UID as the Affected SOP Instance UID in the Command Set of the Event.

The only Attributes that may be updated by a Patient Updated Event Type are:

- Patient Name (0010,0010)
- Patient ID (0010,0020)
- Patient Birth Date (0010,0030)
- Patient Sex (0010,0040)
- Other Patient Ids (0010,1000)
- Current Patient Location (0038,0300)

**Detached Visit Management – Notifications**
*syngo* Dynamics Server supports the DIMSE N-EVENT-REPORT for the Event Types shown in Table 3.1-35.

The Visit Created, Patient Admitted, Patient Discharged, Visit Deleted and Visit Updated Event Types do not initiate any action by *syngo* Dynamics Server.

**Table 3.1-35:** Visit Notification Event Types

| Event Type Name | Event Type ID |
|---|---|
| Visit Created | 1 |
| Visit Scheduled | 2 |
| Patient Admitted | 3 |
| Patient Transferred | 4 |
| Patient Discharged | 5 |
| Visit Deleted | 6 |
| Visit Updated | 7 |

When a Visit Scheduled Event is received, *syngo* Dynamics Server can pre-fetch prior studies based on configuration rules.

When a Patient Transferred Event is received, *syngo* Dynamics Server will search for all studies which contain the same Patient Instance UID as the Referenced Patient Sequence and the same Study Instance UID as the Referenced Study Sequence. *syngo* Dynamics Server will update the Current Patient Location field.

**Detached Study Management – Notifications**
*syngo* Dynamics Server supports the DIMSE N-EVENT REPORT for the Event Types shown in Table 3.1-36.

The Study Started, Study Completed, Study Verified and Study Deleted Event Types do not initiate any action by *syngo* Dynamics Server.

**Table 3.1-36:** Study Notification Event Types

| Event Type Name | Event Type ID |
|---|---|
| Study Created | 1 |
| Study Scheduled | 2 |
| Patient Arrived | 3 |
| Study Started | 4 |
| Study Completed | 5 |
| Study Verified | 6 |
| Study Read | 7 |
| Study Deleted | 8 |
| Study Updated | 9 |

When *syngo* Dynamics Server receives a Study Notification Event, it will use the Affected SOP Instance UID in the Command Set of the Event as the Study Instance UID in a Modality Worklist query. The Study Instance UID will be the only matching Attribute in the query. The Modality Worklist query is described in Section 0.

*syngo* Dynamics Server can use the results returned from the query to update the study and apply configured pre-fetching rules.

*syngo* Dynamics Server does not use any of the Attributes contained within the Data Set of the Event.

**Detached Interpretation Management – Notifications**
*syngo* Dynamics Server supports the DIMSE N-EVENT-REPORT for the Event Types shown in Table 3.1-37.

The Interpretation Created and Interpretation Deleted Event Types do not initiate any action by *syngo* Dynamics Server.

**Table 3.1-37:** Interpretation Notification Event Types

| Event Type Name | Event Type ID |
|---|---|
| Interpretation Created | 1 |
| Interpretation Recorded | 2 |
| Interpretation Transcribed | 3 |
| Interpretation Approved | 4 |
| Interpretation Deleted | 5 |
| Interpretation updated | 6 |

*syngo* Dynamics Server will update the reported status field in the database depending on the Event Type Received.

**Presentation Context Acceptance Criterion – Unsolicited Notifications**
*syngo* Dynamics Server will accept any of the Presentation Contexts listed in Table 3.1-33.

**Transfer Syntax Selection Policies – Unsolicited Notifications**
*syngo* Dynamics Server only supports Implicit VR Little Endian for this Real World Activity.

### 3.1.4.7 Real-World Activity – Study Updates

**Associated Real-World Activity – Study Updates**
A remote AE may connect to the *syngo* Dynamics Server to send a Modality Performed Procedure Step (MPPS) message to share a change in the status of the procedure step. *syngo* Dynamics Server will reflect a status change of a study when it receives an MPPS message from the acquisition device. DISCONTINUED statuses will not be reflected as DISCONTINUED on the *syngo* Dynamics Server – the previous status will remain in effect.

**Accepted Presentation Contexts – Study Updates**
*syngo* Dynamics Server will accept the Presentation Contexts shown in Table 3.1-19.

**Table 3.1-38:** Accepted Presentation Contexts – Study Updates

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended Negotiation |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | |
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | Implicit VR Little Endian 1.2.840.10008.1.2<br>Explicit VR Little Endian 1.2.840.10008.1.2.1 | SCP | None |

**SOP Specific Conformance – Study Updates**
*syngo* Dynamics Server provides standard conformance to the DICOM Modality Performed Procedure Step SOP Class as an SCP.

**Presentation Context Acceptance Criterion – Study Updates**
*syngo* Dynamics Server will only accept the Presentation Context listed in Table 3.1-38.

# 4. Communication profiles

## 4.1 Supported Communication Stacks

*syngo* Dynamics Server provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

## 4.2 OSI Stack

Not supported.

## 4.3 TCP/IP Stack

*syngo* Dynamics Server DICOM services use the TCP/IP stack from the Microsoft Windows Server operating system upon which it executes.

### 4.3.1 Physical Media Support

*syngo* Dynamics Server DICOM services are not dependent on the physical medium over which the TCP/IP executes.

## 4.4 Point-to-Point Stack

Not supported.

# 5. Extensions/Specializations/Privatizations

## 5.1 Private SOPs

The *syngo* Dynamics Server Application Entity provides Conformance to the private SOP Classes listed in Table 5.1-1 as an SCU and/or SCP:

**Table 5.1-1:** *syngo* Dynamics Server Supported SOP Classes

| SOP Class | SOP Class UID | SCU/SCP |
|---|---|---|
| Acuson Structured Report Detail Storage | 1.2.840.10008.5.1.4.1.1.88.3 | Y/Y |
| Siemens CSA Non-Image Storage | 1.3.12.2.1107.5.9.1 | Y/Y |
| Siemens AX frame sets | 1.3.12.2.1107.5.99.3.11 | Y/Y |
| Siemens CT MR volume files | 1.3.12.2.1107.5.99.3.10 | Y/Y |
| TomTec Private File | 1.2.276.0.48.5.1.4.1.1.7 | Y/Y |

### 5.1.1 Association Initiation by Real-World Activity

*syngo* Dynamics Server only initiates associations for the following real-world activities:

- Store Private Objects

#### 5.1.1.1 Real-World Activity – Store Private Objects

**Associated Real World-Activity – Store Private Objects**

*syngo* Dynamics Server will send private objects that have been sent to it previously to a remote AE for storage. An association is established when the user initiates a transmit request. *syngo* Dynamics Server will establish an association automatically in response to a C-MOVE request, archive to PACS autopilot notification or configured study routing rules.

**Proposed Presentation Contexts – Store Private Objects**

*syngo* Dynamics Server may propose any of the Presentation Contexts shown in Table 5.1-2.

**Table 5.1-2:** Proposed Presentation Contexts – Store Private Objects

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended Negotiation |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | |
| Acuson Structured Report Detail Storage | 1.2.840.10008.5.1.4.1.1.88.3 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCU | None |
| Siemens CSA Non-Image Storage | 1.3.12.2.1107.5.9.1 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCU | None |

**SOP Specific Conformance – Store Private Objects**
*syngo* Dynamics Server provides conformance as specified in Section 3.1.2.2.

## 5.1.2 Association Acceptance Policy

*syngo* Dynamics Server accepts associations for the following real-world activities:

- Store Private Objects
- Private Notification of Patient/Study Information Change

**5.1.2.1 Real-World Activity – Store Private Objects**

**Associated Real World-Activity – Store Private Objects**
A remote AE can send private objects to *syngo* Dynamics Server for storage. All private objects received by *syngo* Dynamics Server can be retrieved at a later time as described in Section 3.1.4.2.

**Accepted Presentation Contexts – Store Private Objects**
*syngo* Dynamics Server will accept the Presentation Contexts shown in Table 5.1-3.

**Table 5.1-3:** Accepted Presentation Contexts – Store Private Objects

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Extended |
|---|---|---|---|---|
| **Name** | **UID** | **Name UID** | **Role** | **Negotiation** |
| Acuson Structured Report Detail Storage | 1.2.840.10008.5.1.4.1.1.88.3 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCP | None |
| Siemens CSA Non-Image Storage | 1.3.12.2.1107.5.9.1 | Implicit VR Little Endian 1.2.840.10008.1.2 | SCP | None |

**SOP Specific Conformance – Store Private Object**
*syngo* Dynamics Server provides conformance as specified in Section 3.1.4.2.

**Presentation Context Acceptance Criterion – Store Private Object**
*syngo* Dynamics Server will accept any of the Presentation Contexts listed in Table 5.1-3.

**Transfer Syntax Selection Policies – Store Private Objects**
*syngo* Dynamics Server only supports Implicit VR Little Endian for this Real World Activity.

**5.1.2.2 Real-World Activity – Unsolicited Private Notifications**

**Associated Real World Activity – Unsolicited Private Notifications**
*syngo* Dynamics Server will accept unsolicited private notifications from a remote AE.

**Transfer Syntax Selection Policies – Unsolicited Private Notifications**
*syngo* Dynamics Server only supports Implicit VR Little Endian for this.

# 6. Configuration

## 6.1 AE Title/Presentation Address Mapping

The default AE Title for *syngo* Dynamics Server is the NetBIOS Name of the computer. The system provides a mechanism to configure *syngo* Dynamics server and client AETitles to have a different name than the Host Name. This parameter can be configured. Mapping from AE Title to TCP/IP addresses and ports is maintained within the *syngo* Dynamics Server database.

## 6.2 Configurable parameters

The configurable parameters of the *syngo* Dynamics Server are stored in the database. The following items are configurable:

- **Remote AE Title**
  Allows the *syngo* Dynamics Server to initiate or accept associations from a remote AE.
- **Port**
  Listening Port used by the remote AE uses to accept DICOM communications.
- **Packet Size**
  The maximum size in bytes of the packet used to communicate with the remote AE.
- **Read Timeout**
  How long a communication pause is tolerated before the connection is reset.
- **Connect Timeout**
  How long *syngo* Dynamics Server waits for a response when trying to establish communication with the remote AE.

# 7. Support of extended character sets

*syngo* Dynamics Server supports the following character sets:

- ISO-IR 6 (default) Default repertoire
- ISO-IR 100 Latin Alphabet No. 1

*syngo* Dynamics Server does not support multi-byte characters.

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